BIOGEOCHEMICAL SIGNIFICANCE OF HIGH MOLECULAR WEIGHT LIPIDS FROM SOILS AND FRESHWATERS

Gonzalo ALMENDROS[1*], Francisco J. GONÁLEZ-VILA[2],
José A. GONZÁLEZ-PÉREZ[2], Jesús SANZ[3]

1. MNCN-CSIC. Serrano 115B. Madrid. E-28006, Spain
2. IRNAS-CSIC. Avda. Reina Mercedes, 10. Sevilla, E-41012, Spain
3. IQOG-CSIC. Juan de la Cierva 3. Madrid. E-28006, Spain
*) Corresponding author: *humus@mncn.csic.es*

Most data on the molecular composition of this soil fraction concerns the easily volatile compounds that can be analyzed by gas-chromatography/mass spectrometry using standard long-columns (i.e., 15–30 m length). However, independent experimental approaches to the chemical composition of lipid fractions mainly by ^{13}C-NMR suggested that a substantial amount of lipids compounds remain 'invisible' to conventional chromatographic methods (Almendros et al. 2001), being specifically discriminated those of fairly high molecular weight (MW). In addition, independent studies by direct injection of the same lipid fractions in direct-probe electron impact mass spectrometry indicate large abundances of ions >300 amu which do not correspond to compounds identified after the previous chromatographic separation. The use of fast, short-length (<10 m) high-temperature capillary chromatographic columns has shown to provide enough resolution for lipid compounds of high MW, which can be identified by their diagnostic mass spectra (Gutierrez et al. 2001).

In this communication, this approach has been used to study the high MW lipid assemblages from soils subjected to different management practices, as well as to lipids isolated from a series of freshwater sampling stations along the low basin of the Guadarrama river (Madrid). The use of short-columns lead to successful identification of complex lipids both among the soil and freshwater lipids. With this approach improved accurate information was obtained on the balance between inputs from terrestrial and aquatic organisms provided by the short-column chromatograms. In particular significant differences are displayed by indices such as the relative amount of waxes and the chain length and carbon preference index of the alkyl series, even in samples where diagnostic cyclic biomarker compounds were lacking.

REFERENCES

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